UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/988,706 | 11/20/2001 | Kazunori Numata | 2001_1727A | 9132 |

513 7590 11/03/2005

WENDEROTH, LIND & PONACK, L.L.P.
2033 K STREET N. W.
SUITE 800
WASHINGTON, DC 20006-1021

| EXAMINER | |
|---|---|
| SINGH, DALZID E | |
| **ART UNIT** | **PAPER NUMBER** |
| 2633 | |

DATE MAILED: 11/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. 09/988,706 | Applicant(s) NUMATA ET AL. | |
|---|---|---|---|
| | Examiner Dalzid Singh | Art Unit 2633 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on 15 September 2005.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) 1-18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-18 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

## DETAILED ACTION

1. The finality of the previous Office action is hereby withdrawn. Applicant's first submission after final filed on 15 September 2005 has been entered. Rejection based on new cited reference follow.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forrest et al (US Patent No. 4,709,413) in view of Marcuse et al (US Patent No. 5,699,464) and further in view of Kaneko et al (US Patent No. 4,815,807).

Regarding claim 1, Forrest et al disclose an optical transmission system (fig. 2) for transmitting an optical signal from terminal (10) (including transmitter (16), col. 3, lines 11-15) to a terminal (12, including detector (22), col. 3, lines 20-23) through a multi-mode fiber (col. 3, line 34), wherein the terminal (transmitter) (10) comprises:

a light emission element (16, col. 3, line 18) for generating an optical signal; and

at least one lens ((30), col. 4, line 33-35) for converging the optical signal generated by the light emission element to focus at a focal point (col. 4, lines 36-39). wherein:

the optical signal converged by the at least one lens (such 30, see fig. 2) enters an input plane of the multi-mode fiber (14) to propagate through the multi-mode fiber (col, 3, lines 63-67), and is outputted from an output plane of the multi-mode fiber at the other end (end at 12);

a receiver (such terminal 12, col. 3, lines 20-23) comprising a light receiving element (22) for receiving the optical signal outputted from the multi-mode fiber (14), wherein

an optical axis of said at least one lens is aligned with a fiber axis of the multimode fiber (fig. 2 and col. 4, lines 36-44; it would have been obvious that the optical axis of the lens is aligned to the fiber in order to maximized transfer of optical signal).

Forrest et al disclose optical transmission system as discussed above and differ from the claimed invention in that Forest et al do not specifically disclose a vertex of said at least one lens is located at a first predetermined distance from the input plane of the multi-mode fiber, the first predetermined distance being greater or less than a distance from the vertex of said at least one lens to a focal point of said at least one lens. However, arranging proper placement of the lens with respective to the multi-mode fiber optical cable is well known. Marcuse et al is cited to show such well known concept. In Fig. 6, and col. 3, lines 54-67 to col. 4, lines 1-25, Marcuse et al teach placement of the lens (62) with respect to the fiber (60). In such arrangement a point on the outer surface of the lens can be considered as the vertex of the lens, which has a predetermined distance (the predetermined distance is slightly greater than Dm, shown

by the end point of the arrow (R)) from input plane of the fiber (the input of the plane of the fiber is the end of the fiber). Marcuse et al show that the first predetermined distance being is greater than the distance from the vertex of said at least one lens to a focal point of said at least one lens (Fr). Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to arrange such placement of the lens with respect to the fiber. One of ordinary skill in the art would have been motivated to do such in order to maximize coupling efficiency.

Furthermore, the combination of Forrest et al and Marcuse et al differs from the claimed invention in that the combination does not disclose the predetermined distance is selected based on an eye opening factor of the multi-mode fiber and a power of the optical signal. However, it is well known to select such predetermined distance based on a measured value. One of the value of such measurement is power of the optical signal. Kaneko et al is cited to show such well known concept. In Fig. 7 and in col. 5, lines 36-47, Kaneko et al disclose coupling of optical fiber to the lens separated by predetermined distance (l) in which power the light is measured by the use of power meter. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to select predetermined distance based on power of the signal. One of ordinary skill in the art would have been motivated to do this in order to determined suitable distance in order to decrease or eliminate coupling losses and provide maximum coupling efficiency. Furthermore, as indicated by applicant in the specification on page 13, lines 10-13, eye opening factor is measured using power meter. Therefore, it would have been obvious to an artisan of ordinary skill to utilize the

power meter of Kaneko et al to measure eye opening factor of the optical signal. One of ordinary skill in the art would have been motivated to do this in order to obtain more information regarding quality of the measured optical signal.

Regarding claim 2, Forrest (fig. 2) shows the input plane (of fiber 14) is placed at a position farther away from the at least one lens than the focal point.

Regarding claim 3, Forrest discloses an optical transmission system (fig. 2) for transmitting an optical signal from terminal (10) (including transmitter (16), col. 3, lines 11-15) to a terminal (12, including detector (22), col. 3, lines 20-23) through a multi-mode fiber (col. 3, line 34), wherein the terminal (transmitter) (10) comprises:

a light emission element (16, col. 3, line 18) for generating an optical signal; and

at least one lens (30, col. 4, line 33-35) for converging the optical signal generated by the light emission element to focus at a focal point (col. 4, lines 36-39). wherein

the optical signal converged by the at least one lens (such 30, see fig. 2) enters an input plane of the multi-mode fiber (14) to propagate through the multi-mode fiber (col, 3, lines 63-67), and is outputted from an output plane of the multi-mode fiber at the other end (end at 12); and,

an optical axis of said at least one lens is aligned with a fiber axis of the multimode fiber (fig. 2 and col. 4, lines 36-44; it would have been obvious that the optical axis of the lens is aligned to the fiber in order to maximized transfer of optical signal).

Forrest et al disclose optical transmission system as discussed above and differ from the claimed invention in that Forest et al do not specifically disclose a vertex of said at least one lens is located at a first predetermined distance from the input plane of the multi-mode fiber, the first predetermined distance being greater or less than a distance from the vertex of said at least one lens to a focal point of said at least one lens. However, arranging proper placement of the lens with respective to the multi-mode fiber optical cable is well known. Marcuse et al is cited to show such well known concept. In Fig. 6, and col. 3, lines 54-67 to col. 4, lines 1-25, Marcuse et al teach placement of the lens (62) with respect to the fiber (60). In such arrangement a point on the outer surface of the lens can be considered as the vertex of the lens, which has a predetermined distance (the predetermined distance is slightly greater than Dm, shown by the end point of the arrow (R)) from input plane of the fiber (the input of the plane of the fiber is the end of the fiber). Marcuse et al show that the first predetermined distance being is greater than the distance from the vertex of said at least one lens to a focal point of said at least one lens (Fr). Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to arrange such placement of the lens with respect to the fiber. One of ordinary skill in the art would have been motivated to do such in order to maximize coupling efficiency.

Furthermore, the combination of Forrest et al and Marcuse et al differs from the claimed invention in that the combination does not disclose the predetermined distance is selected based on an eye opening factor of the multi-mode fiber and a power of the optical signal. However, it is well known to select such predetermined distance based

on a measured value. One of the value of such measurement is power of the optical signal. Kaneko et al is cited to show such well known concept. In Fig. 7 and in col. 5, lines 36-47, Kaneko et al disclose coupling of optical fiber to the lens separated by predetermined distance (l) in which power the light is measured by the use of power meter. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to select predetermined distance based on power of the signal. One of ordinary skill in the art would have been motivated to do this in order to determined suitable distance in order to decrease or eliminate coupling losses and provide maximum coupling efficiency. Furthermore, as indicated by applicant in the specification on page 13, lines 10-13, eye opening factor is measured using power meter. Therefore, it would have been obvious to an artisan of ordinary skill to utilize the power meter of Kaneko et al to measure eye opening factor of the optical signal. One of ordinary skill in the art would have been motivated to do this in order to obtain more information regarding quality of the measured optical signal.

Regarding claim 4, Forrest (fig. 2) shows the input plane (of fiber 14) is placed at a position farther away from the at least one lens than the focal point.

Regarding claim 5, Forrest (fig. 2) shows element (22) (in associated with hole (74), col, 4, lines 42-44) as a receptacle for connecting to the multi-mode fiber to affix the input plane (of fiber) at a position other than the focal point.

3. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forrest et al (US Patent No. 4,709,413) in view of Marcuse et al (US Patent No. 5,699,464) and further in view of Auracher (US Patent No. 3,980,392).

Regarding claim 6, Forrest discloses an optical transmission system (fig. 2) for transmitting an optical signal from terminal (10) (including transmitter (16), col. 3, lines 11-15) to a terminal (12, including detector (22), col. 3, lines 20-23) through a multi-mode fiber (col. 3, line 34), wherein the terminal (transmitter) (10) comprises:

a light emission element (16, col. 3, line 18) for generating an optical signal; and

at least one lens (30, col. 4, line 33-35) for converging the optical signal generated by the light emission element to focus at a focal point (col. 4, lines 36-39). wherein:

the optical signal converged by the at least one lens (such 30, see fig. 2) enters an input plane of the multi-mode fiber (14) to propagate through the multi-mode fiber (col, 3, lines 63-67), and is outputted from an output plane of the multi-mode fiber at the other end (end at 12);

the receiver (such terminal 12, col. 3, lines 20-23) comprises a light receiving element (22) for receiving the optical signal outputted from the multi-mode fiber (14); and the input plane is placed at a position (at the center of hole 32, see fig. 2, col. 3, lines 63-67) other than the focal point, and the light receiving plane (26) of the light receiving element is placed at a predetermined distance from the output plane (of fiber) (also fig. 2, col. 4, lines 40-44); and

a receptacle (such (22), in associated with hole (74)), for connecting to the multimode fiber to affix the output plane at a predetermined distance from the light-receiving plane (26) (see fig. 2, col. 4, lines 40-44).

Forrest et al differ from the claimed invention in that Forrest et al do not specifically disclose that a predetermined distance is determined based on a core diameter of the multi-mode fiber, a diameter of the light-receiving plane, and a maximum angle among angles of modes of the optical signal outputted from the output plane of the multi-mode fiber which are capable of entering the light-receiving plane. However, arrangement of optical lens, such as lens for receiving light, relative to the multi-mode fiber optical cable is well known. Marcuse et al is cited to show such well known concept. In col. 3, lines 54-67 and col. 4, lines 1-25, Marcuse et al teach mathematical relationship between diameter of fiber core, radius of glass (lens) and refractive index (angles of the optical signal). Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to arrange placement of the lens and fiber is relation to each other. One of ordinary skill in the art would have been motivated to do such in order to maximize coupling efficiency.

Furthermore, the combination of Forrest et and Marcuse et al disclose the use of multi-mode fiber and differs from the claimed invention in that the combination do not specifically disclose the light receiving element receives a lower order mode of the optical signal and a higher order mode is prevented from entering-the light-receiving plane of said light receiving element. However, since the multi-mode fiber carries different modes of optical signal, it is well known to provide a filter to select a particular

mode. Auracher is cited to show such well known concept. In col. 1, lines 30-45, Auracher et al teach the use of mode filter to block a particular mode. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to select a particular mode and prevent other mode. One of ordinary skill in the art would have been motivated to do such in order to eliminate noise associated with particular signal.

Regarding claim 7, the light receiving element of Forrest is a Si PIN photodiode (col. 12, lines 22-23).

Regarding claim 8, Forrest discloses a photodetector (receiver) (22, see fig. 2, col. 3, lines 14-15 and lines 21-22) for receiving an optical signal outputted (such beam (24)) from a multi-mode fiber (14), comprising:

a light receiving element having a light-receiving plane (26) for receiving the optical signal from an output plane of the multi-mode fiber (14) (col. 3, lines 34-37) and a receptacle (such (22), in associated with hole (74)), for connecting to the multimode fiber to affix the output plane at a predetermined distance from the light-receiving plane (26) (see fig. 2, col. 4, lines 40-44).

Forrest et al differ from the claimed invention in that Forrest et al do not specifically disclose that a predetermined distance is determined based on a core diameter of the multi-mode fiber, a diameter of the light-receiving plane, and a maximum angle among angles of modes of the optical signal outputted from the output plane of the multi-mode fiber which are capable of entering the light-receiving plane. However, arrangement of optical lens, such as lens for receiving light, relative to the

multi-mode fiber optical cable is well known. Marcuse et al is cited to show such well known concept. In col. 3, lines 54-67 and col. 4, lines 1-25, Marcuse et al teach mathematical relationship between diameter of fiber core, radius of glass (lens) and refractive index (angles of the optical signal). Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to arrange placement of the lens and fiber is relation to each other. One of ordinary skill in the art would have been motivated to do such in order to maximize coupling efficiency.

Furthermore, the combination of Forrest et and Kaneko et al disclose the use of multi-mode fiber and differs from the claimed invention in that the combination do not specifically disclose that the light receiving element receives a lower order mode of the optical signal and a higher order mode is prevented from entering-the light-receiving plane of said light receiving element. However, since the multi-mode fiber carries different modes of optical signal, it is well known to provide a filter to select a particular mode. Auracher is cited to show such well known concept. In col. 1, lines 30-45, Auracher et al teach the use of mode filter to block a particular mode. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to select a particular mode and prevent other mode. One of ordinary skill in the art would have been motivated to do such in order to eliminate noise associated with particular signal.

4. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forrest et al (US Patent No. 4,709,413) in view of Marcuse et al (US Patent No.

5,699,464) further in view of Kaneko et al (US Patent No. 4,815,807) and further in view of Auracher (US Patent No. 3,980,392).

Regarding claim 9, Forrest discloses an optical transmission system (fig. 2) for transmitting an optical signal from terminal (10) (including transmitter (16), col. 3, lines 11-15) to a terminal (12, including detector (22), col. 3, lines 20-23) through a multi-mode fiber (col. 3, line 34), wherein the terminal (transmitter) (10) comprises:

a light emission element (16, col. 3, line 18) for generating an optical signal; and

at least one lens (30, col. 4, line 33-35) for converging the optical signal generated by the light emission element to focus at a focal point (col. 4, lines 36-39). wherein:

the optical signal converged by the at least one lens (such 30, see fig. 2) enters an input plane of the multi-mode fiber (14) to propagate through the multi-mode fiber (col, 3, lines 63-67), and is outputted from an output plane of the multi-mode fiber at the other end (end at 12);

an optical axis of said at least one lens is aligned with a fiber axis of the multimode fiber (fig. 2 and col. 4, lines 36-44; it would have been obvious that the optical axis of the lens is aligned to the fiber in order to maximized transfer of optical signal);

a receiver (such terminal 12, col. 3, lines 20-23) comprising a light receiving element (22) having a light receiving plane for receiving the optical signal outputted from the multi-mode fiber (14) (the input plane is placed at the center of hole 32, see fig. 2, col. 3639 ; also fig. 2, col. 4, lines 40-44), and

a receptacle (such (22), in associated with hole (74)), for connecting to the multimode fiber to affix the output plane at a predetermined distance from the light-receiving plane (26) (see fig. 2, col. 4, lines 40-44).

Forrest et al disclose optical transmission system as discussed above and differ from the claimed invention in that Forest et al do not specifically disclose a vertex of said at least one lens is located at a first predetermined distance from the input plane of the multi-mode fiber, the first predetermined distance being greater or less than a distance from the vertex of said at least one lens to a focal point of said at least one lens. However, arranging proper placement of the lens with respective to the multi-mode fiber optical cable is well known. Marcuse et al is cited to show such well known concept. In Fig. 6, and col. 3, lines 54-67 to col. 4, lines 1-25, Marcuse et al teach placement of the lens (62) with respect to the fiber (60). In such arrangement a point on the outer surface of the lens can be considered as the vertex of the lens, which has a predetermined distance (the predetermined distance is slightly greater than Dm, shown by the end point of the arrow (R)) from input plane of the fiber (the input of the plane of the fiber is the end of the fiber). Marcuse et al show that the first predetermined distance being is greater than the distance from the vertex of said at least one lens to a focal point of said at least one lens (Fr). Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to arrange such placement of the lens with respect to the fiber. One of ordinary skill in the art would have been motivated to do such in order to maximize coupling efficiency. Moreover, Forrest et al differ from the claimed invention in that Forrest et al do not specifically

disclose that a predetermined distance is determined based on a core diameter of the multi-mode fiber, a diameter of the light-receiving plane, and a maximum angle among angles of modes of the optical signal outputted from the output plane of the multi-mode fiber which are capable of entering the light-receiving plane. However, arrangement of optical lens, such as lens for receiving light, relative to the multi-mode fiber optical cable is well known. Marcuse et al is cited to show such well known concept. In col. 3, lines 54-67 and col. 4, lines 1-25, Marcuse et al teach mathematical relationship between diameter of fiber core, radius of glass (lens) and refractive index (angles of the optical signal). Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to arrange placement of the lens and fiber is relation to each other. One of ordinary skill in the art would have been motivated to do such in order to maximize coupling efficiency.

Furthermore, the combination of Forrest et al and Marcuse et al differs from the claimed invention in that the combination does not disclose the predetermined distance is selected based on an eye opening factor of the multi-mode fiber and a power of the optical signal. However, it is well known to select such predetermined distance based on a measured value. One of the value of such measurement is power of the optical signal. Kaneko et al is cited to show such well known concept. In Fig. 7 and in col. 5, lines 36-47, Kaneko et al disclose coupling of optical fiber to the lens separated by predetermined distance (l) in which power the light is measured by the use of power meter. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to select predetermined distance based on power of

the signal. One of ordinary skill in the art would have been motivated to do this in order to determined suitable distance in order to decrease or eliminate coupling losses and provide maximum coupling efficiency. Furthermore, as indicated by applicant in the specification on page 13, lines 10-13, eye opening factor is measured using power meter. Therefore, it would have been obvious to an artisan of ordinary skill to utilize the power meter of Kaneko et al to measure eye opening factor of the optical signal. One of ordinary skill in the art would have been motivated to do this in order to obtain more information regarding quality of the measured optical signal.

Furthermore, the combination of Forrest et, Marcuse et al and Kaneko et al disclose the use of multi-mode fiber and differs from the claimed invention in that the combination do not specifically disclose that the light receiving element receives a lower order mode of the optical signal and a higher order mode is prevented from entering-the light-receiving plane of said light receiving element. However, since the multi-mode fiber carries different modes of optical signal, it is well known to provide a filter to select a particular mode. Auracher is cited to show such well known concept. In col. 1, lines 30-45, Auracher et al teach the use of mode filter to block a particular mode. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to select a particular mode and prevent other mode. One of ordinary skill in the art would have been motivated to do such in order to eliminate noise associated with particular signal.

Regarding claim 10, Forrest (fig. 2) shows the input plane (fiber 14) is placed at a position farther away from a vertex of the at least one lens (30) than the focal point.

Regarding claim 11, the light receiving element of Forrest is a Si PIN photodiode (col. 12, lines 22-23).

***Response to Arguments***

5. Applicant's arguments with respect to claims 1, 3 and 9 have been considered but are moot in view of the new ground(s) of rejection.

6. Applicant's arguments filed 15 September 2005 have been fully considered but they are not persuasive.

Applicant argues that the references Forrest et al and Auracher do not disclose predetermined distance is determined based on a core diameter of the multi-mode fiber, a diameter of the light-receiving plane, and a maximum angle among angles of modes of the optical signal outputted from an output plane of the multi-mode fiber which are capable of entering the light-receiving plane. However, such limitation is taught by Marcuse et al. In col. 3, lines 54-67 and col. 4, lines 1-25, Marcuse et al teach mathematical relationship between diameter of fiber core, radius of glass (lens) and refractive index (angles of the optical signal). In Fig. 6, Marcuse et al show variable angle based on the mathematical relationship as discussed above. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide arrangement of the lens and fiber is relation to each other based on a core diameter of the multi-mode fiber, a diameter of the light-receiving plane, and a

maximum angle among angles of modes of the optical signal outputted from an output plane of the multi-mode fiber.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

### *Conclusion*

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Oyamade et al (US Patent No. 4,807,954) is cited to show optical coupling device.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalzid Singh whose telephone number is (571) 272-3029. The examiner can normally be reached on Mon-Fri 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DS
October 19, 2005

JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600